

Express Mail Label No.: EL 640 011 113 US

IN THE U.S. PATENT AND TRADEMARK OFFICE

April 3, 2001

Applicant(s) : Toshiaki MOTONAGA et al.

For : HALFTONE PHASE SHIFTING PHOTOMASK AND
 BLANKS FOR HALFTONE PHASE SHIFTING
 PHOTOMASK THEREFOR AND A METHOD FOR FORMING
 PATTERN BY USING THE HALFTONE PHASE
 SHIFTING PHOTOMASK

Atty. Docket No.: OPS Case 529

Assistant Commissioner for Patents

Washington, DC 20231

AMENDMENT BEFORE FIRST OFFICE ACTION

Sir:

Prior to issuance of the first Office Action in the
 above-identified application, kindly enter the following:

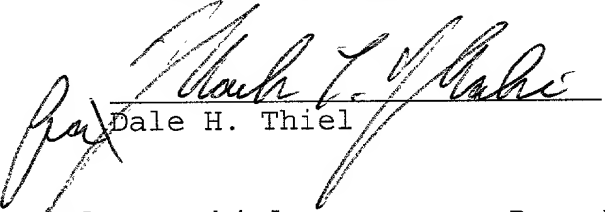
IN THE SPECIFICATION

Paragraphs 0029, 0030, 0035, 0036 and 0038-0040 are
 amended as indicated in the attached marked-up copy. Pursuant
 to 37 CFR §1.121, replacement pages with the amended
 paragraphs are attached.

REMARKS

The above amendment is being made to conform the brief
 descriptions of Figs. 1, 2, 5, 7, 8 and 10-12 to the drawing
 sheets.

Respectfully submitted,


 Dale H. Thiel

DHT/jp

FLYNN, THIEL, BOUTELL
 & TANIS, P.C.

2026 Rambling Road

Kalamazoo, MI 49008-1699

Phone: (616) 381-1156

Fax: (616) 381-5465

Dale H. Thiel

David G. Boutell

Ronald J. Tanis

Terryence F. Chapman

*Mark L. Maki

David S. Goldenberg

Sidney B. Williams, Jr.

Liane L. Churney

Brian R. Tumm

Reg. No. 24 323

Reg. No. 25 072

Reg. No. 22 724

Reg. No. 32 549

Reg. No. 36 589

Reg. No. 31 257

Reg. No. 24 949

Reg. No. 40 694

Reg. No. 36 328

Encl: Marked-up paragraphs 0029, 0030, 0035, 0036
 and 0038-0040 (2 pages)

Replacement paragraphs 0029, 0030, 0035, 0036
 and 0038-0040 (2 pages)

112.9803

[0029] ~~Fig. 1 is a view~~Figs. 1(a), 1(b), 1(c) and 1(d)
are views for showing the principle of halftone phase
shifting lithography.

[0030] ~~Fig. 2 is a view~~Figs. 2(a), 2(b), 2(c) and 2(d)
are views for showing conventional lithography against Fig.
1.

[0033] ~~Fig. 5 is a view~~Figs. 5(a) and 5(b) are views for
showing a state in which phase difference and transmittance
are changed by applying excimer laser to a halftone phase
shifting photomask having the halftone phase shifting film
containing chromium and fluorine.

[0035] ~~Fig. 7 is a view~~Figs. 7(a) and 7(b) are views for
showing that the spectrum analyzed from reflectance of X-
rays (of after Fourier transform) is changed by applying
excimer laser to a halftone phase shifting photomask having
the halftone phase shifting film containing chromium and
fluorine, in which Fig. 7(a) shows the spectrum analyzed
from reflectance of X-rays of before the applying of excimer
laser to the halftone phase shifting photomask, and Fig.
7(b) shows the spectrum analyzed from reflectance of X-rays
of after the applying of excimer laser to the halftone phase
shifting photomask.

[0036] ~~Fig. 8 is a view~~Figs. 8(a), 8(b), 8(c) 8(d) and
8(e) are views for illustrating the processes in which
blanks for halftone phase shifting photomask are produced
and then a halftone phase shifting photomask of example 1 is
obtained by processing the blanks for halftone phase
shifting photomask.

April 3, 2001

Page 2

[0038] ~~Fig. 10 is a view~~Figs. 10(a), 10(b), 10(c) and 10(d) are views for illustrating the process for producing a halftone phase shifting photomask of Example 2.

[0039] ~~Fig. 11 is a view~~Figs. 11(a) and 11(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 1.

[0040] ~~Fig. 12 is a view~~Figs. 12(a) and 12(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 4.

[0029] Figs. 1(a), 1(b), 1(c) and 1(d) are views for showing the principle of halftone phase shifting lithography.

[0030] Figs. 2(a), 2(b), 2(c) and 2(d) are views for showing conventional lithography against Fig. 1.

[0033] Figs. 5(a) and 5(b) are views for showing a state in which phase difference and transmittance are changed by applying excimer laser to a halftone phase shifting photomask having the halftone phase shifting film containing chromium and fluorine.

[0035] Figs. 7(a) and 7(b) are views for showing that the spectrum analyzed from reflectance of X-rays (of after Fourier transform) is changed by applying excimer laser to a halftone phase shifting photomask having the halftone phase shifting film containing chromium and fluorine, in which Fig. 7(a) shows the spectrum analyzed from reflectance of X-rays of before the applying of excimer laser to the halftone phase shifting photomask, and Fig. 7(b) shows the spectrum analyzed from reflectance of X-rays of after the applying of excimer laser to the halftone phase shifting photomask.

[0036] Figs. 8(a), 8(b), 8(c) 8(d) and 8(e) are views for illustrating the processes in which blanks for halftone phase shifting photomask are produced and then a halftone phase shifting photomask of example 1 is obtained by processing the blanks for halftone phase shifting photomask.

[0038] Figs. 10(a), 10(b), 10(c) and 10(d) are views for illustrating the process for producing a halftone phase shifting photomask of Example 2.

[0039] Figs. 11(a) and 11(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 1.

[0040] Figs. 12(a) and 12(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 4.